bat units helped the military police. The lack of transportation, food, water, and shelter for these prisoners was overwhelming.

The brigade formation changed again, anticipating a mission to continue eastward and with continued lack of contact to our south. Dark hazy oil smoke weighted the late afternoon air. We crossed into Kuwait and knew we really had the Iraqis now. Then we heard that a convoy of 40 vehicles was coming from the south headed into our flank. We rapidly reoriented a tank battalion to protect the southern flank, but nothing ever showed. We would learn later that the report, which should have said "northern flank" instead, was a delayed report of the Iraqi tank battalion we had destroyed an hour earlier.

Night fell. A scout identified an Iraqi tank company several kilometers to our front in Kuwait, and our artillery battalion fired 120 rounds of bomblet munitions. We would not know the results until the next morning. Again, our commanders huddled, the intelligence officer provided an update, and we reviewed the attack plan for the next day.

It had been 40 hours since I last slept. Exhaustion overcame me, and I collapsed in the corner of my Bradley, as reports continued across the radio nets, for four hours of sleep that went too fast.

At 0530 on the 28th, a one-hour rocket and artillery preparation preceded the attack. The brigade commander and I made our way to the front of the formation. The artillery fire made the air shake, and rockets screamed like holiday fireworks. The low-lying fog was blackened from the burning oil wells. Hundreds of fleeing Iraqi units battled to get back into Iraq.

Our attack helicopters stayed close to the fight, providing long range observation and fires. Because friendly forces were converging, target identification was critical. At 0720 the brigade commander directed a cease fire. A unit to our south reported that we were firing into their zone. Luckily, our scouts identified the problems. A friendly company there had mistakenly wandered into our zone, forward of our lead battalion, and our ricochets had hit their vehicles. After they moved out of our zone, the fight continued, only to be stopped by the international cease-fire at 0800. The war was over.

Our follow-on clear-in-zone mission was slow and dangerous. Huge ammunition dumps and unexploded munitions littered the battlefield—two more of our soldiers would lose their lives there. In four days, we had to return through the areas of the last three fights and destroy by-passed equipment, munitions, and positions back in Iraq—a monumental task.

Our mission then turned to humanitarian aid along the southern side of the Euphrates River valley. We gave medical aid to more than 2,000 civilians. More than 100,000 refugees were searched and processed. The bodies of unknown hundreds were carefully collected, marked, and buried with compassion.

Reflecting on the battles, we collected detailed data on every portion. More than 750 combat vehicles had been destroyed, more than half of them tanks and infantry armored assault vehicles. More than 1,000 enemy prisoners of war had been captured.

Battles were fought at extreme ranges, and engagement information was critical. On the average, we acquired targets three kilometers away and destroyed them two to two-and-one-half kilometers out. Most Iraqi direct fire systems could not extend farther than one-and-eight-tenths kilometers.

There were many reasons for our success at brigade level: No secrets were kept from the soldiers; they knew the plans and knew we would tell them everything they needed to know before an attack. Their clear understanding of the intent provided the continuity for the offensive. Our NCOs and young officers provided the discipline, enforced the standards, and kept the soldiers alive. The soldiers' confidence in their leaders, the plan, and the equipment made the force resilient and cohesive. We could not have asked for more.

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The Soldier's Load

LIEUTENANT SCOTT C. PORTER

During Operation DESERT SHIELD, a brigade conducted a live fire training assault to seize a bridge. The brigade commander noticed that the equipment the soldiers carried was interfering with the accomplishment of their mission. At the after action review he directed the battalion commanders to investigate the weight the soldiers carried in their battalions. At the briefback one commander indicated that the average soldier in his battalion

carried more than 100 pounds.

At the beginning of DESERT STORM, as this same brigade moved into Iraq, its load remained unchanged. The problem was that all of the items were indispensable, and the supply lines were stretched so tight that the soldiers had to carry large amounts of water and ammunition. The soldiers did not even carry sleeping bags, despite temperatures that approached freezing at night.

The Army has concerned itself with this problem repeatedly since the end of World War II. In 1948 and through the early 1950s, Field Forces Board #3 conducted some of the earliest official studies of the soldier's load. During the early 1960s, the Infantry Combat Developments Agency met and made its recommendations on the subject. Most recently, the Army Development and Employment Agency issued its report in 1987, and many of this agency's suggestions were incorporated into Field Manual 21-18, Foot Marches, dated June 1990.

STUDIES

Since 1950, official studies such as these have relied extensively on S.L.A. Marshall's *The Soldier's Load and the Mobility of a Nation,* which examined a man's physical load-bearing limitations and ways of overcoming them.

Marshall noted that the infantryman is "a beast of burden" but that his chief function in war does not begin until he delivers that burden to the appointed place. His load should therefore be light enough to enable him to fight unimpaired when he arrives at the field of battle. In the past, this has not always happened. Marshall contended, for example, that during the assault on Normandy, the troops were slow coming off the beaches because they were exhausted from their heavy loads.

John English, in *Perspectives on Infantry*, agreed:

Most infantry in the leading waves were, in fact, criminally overloaded. The American soldier carried more than 80 pounds, and any careful examination of photographs of British and Canadian troops waddling ashore on that day will reveal that they, too, were weighted down with roughly the same load.

Leaders need to remember that weight must often be sacrificed in the interest of speed. A soldier must not only arrive at the battlefield capable of fighting but must also arrive early enough to influence the action. Any extra equipment he carries will be useless if it arrives too late. Leaders throughout history have demonstrated the advantages of fast-moving forces carrying as little equipment as possible. Figure 1 shows how increased weight affects a soldier's ability to march on different types of surfaces and, not surprisingly, as weight increases, speed decreases. The following rules of thumb apply:

- The distance marched in six hours decreases by one mile for every 10 pounds a soldier carries over 40 pounds.
- The time of an assault course increases by 15 percent for every 10 pounds over 40 pounds.
- The distances traveled are reduced by half when moving over average gradients of 10 percent.

Marshall said that the Army must "break away from the stubborn idea, dating from the Medes and the Persians, that what a soldier can carry on a hard road march during training is a fair measure of the load that he can manage efficiently when under fire." Interestingly, he had observed during World War I that troops could hardly carry their loads when marching to the front but had no trouble with the same loads when marching to the rear. Another important consideration during combat operations is that fear burns the same energy stores as physical work.

To reduce the load on the soldier's back, leaders must use their available transportation effectively and must develop a unit's ability to carry what it must through load planning and training.

Although load planning is a critical task for all leaders, senior commanders should limit their guidance and allow the sub-unit commander who must carry out a mission to decide what his soldiers will carry for each operation. Load planning consists of tailoring the load to the mission and then dividing it into echelons (combat load, sustainment load, and contingency load), calculating its weight, and arranging for its transport.

The first step in this process is analyzing the mission to determine the packing list. A leader should base his list on guidance from higher headquarters and on the minimum-load concept,

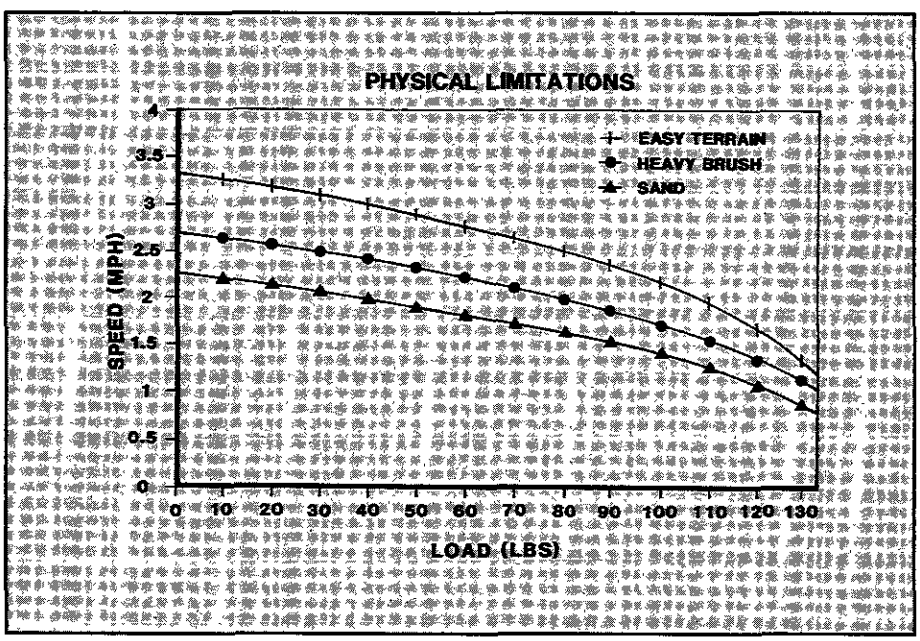

Figure 1

which lays out certain items that are common to all missions.

Any additions to or deletions from this minimum load configuration will be based on the estimate of the situation. FM 21-18 (Table 5-3) contains a list of factors that should be assigned priorities as part of that estimate. A leader can examine the factors on this list and then tailor his soldiers' loads for each specific mission. Once the leader has determined what the soldier needs for his mission, he can begin to divide the load into the three echelons (Figure 2).

Providing transportation for the combat load is the responsibility of the company, and this load is split into the fighting load and the approach march load. The items that go into each of these loads depends upon where in the operation the items will be needed. Both of these loads should be kept as light as possible.

The fighting load includes weapon, load-bearing equipment (LBE), helmet, and a reduced amount of ammunition. (Clothing worn is not considered part of the load because the body is accustomed to carrying that weight.) If heavy items such as radios, crew-served weapon ammunition, and mortar rounds are carried, they must be cross-loaded. This cross-loading will make the fighting load too heavy for a quick maneuver during combat, and the items not essential to the immediate operation should be dropped before, or upon, enemy contact.

The approach march load—the load a soldier carries as he moves toward the battle—contains the items needed for slightly more extended operations against the enemy. It consists of weapon, basic load of ammunition, and LBE, plus a small assault pack or lightly loaded rucksack, which the soldier drops as soon as he begins to close with the enemy. Once the pack is dropped, it should be cached or otherwise secured during the fight.

As many items as possible should be put in the sustainment load instead of being carried in the combat load. This echelon of the load is left with the battalion S-4 to be secured and transported.

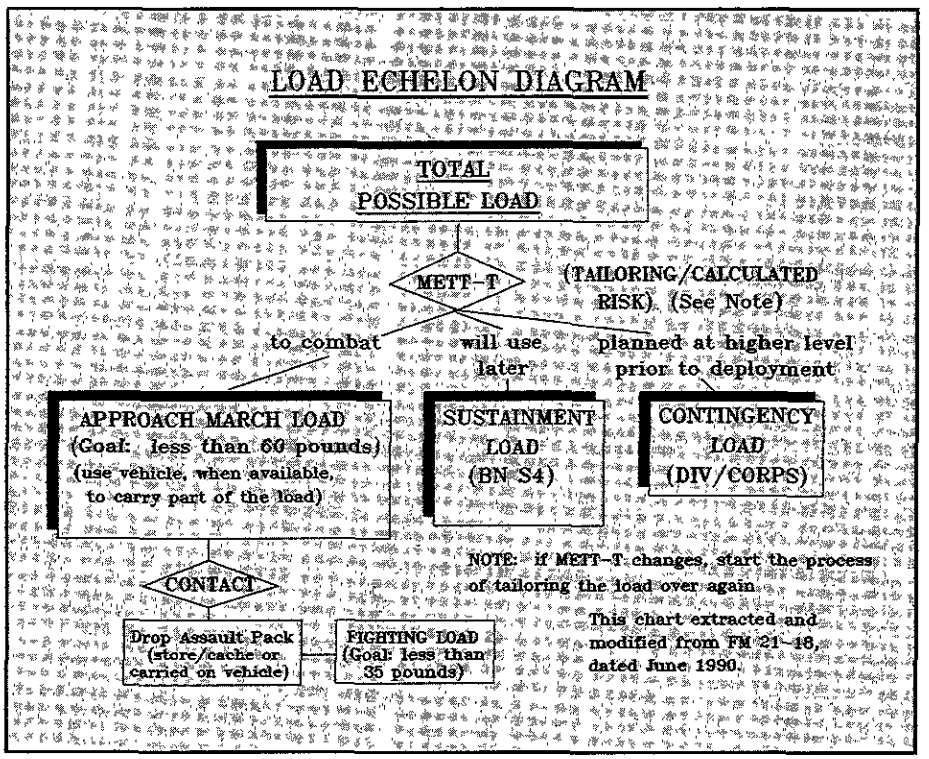

Figure 2

It contains spare clothing and equipment, protective items for specific threats, limited personal effects, and anything the commander deems necessary for extended operations. This load should be stored in a forward operations base or field trains to be delivered by the S-4 as the commander requests.

Another echelon of the load is the contingency load, which contains items that will not be needed immediately—personal effects and items for threats that are not imminent. This load, stored and maintained at division level, allows a unit to change its mission once it has deployed.

The operations of the 2d Brigade, 82d Airborne Division, during Operation DESERT SHIELD/STORM provide an example of the relationship between these loads. At Christmas 1990 the brigade was conducting training far to the south of the front. During this relatively peaceful time, and especially as a result of the holiday, the soldiers had accumulated many items they could not take into combat.

When the order came for the brigade to spearhead the French 6th Light Armored Division's attack into Iraq, the chain of command took steps to care for the soldiers' personal effects and excess baggage. They made lists of what a soldier would carry on his person (fighting load), what he would carry in his rucksack (approach march load), what he would pack in his A-bag (sustainment load), and what would go in his B-bag (contingency load). Items that did not fit in these categories, the soldier shipped home. In this way, the leaders ensured that the soldiers properly accounted for all of their belongings and equipment.

As a commander tailors and echelons his load, he should be conscious of how much the load weighs. The goal is for the soldiers to carry as little as possible.

In July 1991, the Commander of the U.S. Army Training and Doctrine Command (TRADOC) amended the guidance in FM 21-18 concerning the total weight of the combat load. The fighting load should not exceed 35 pounds, and the approach march load should not exceed 25 pounds, keeping the total to no more than 60 pounds (Figure 3). These weights apply to the basic rifleman. Soldiers who carry other weapon systems may have heavier loads that are based on the additional weight of those systems.

Once the company commander has tailored and echeloned his load, he must arrange transport for the various echelons. He needs to coordinate with the S-4 for the delivery of the contingency and sustainment loads at the appropriate time. He must also ensure that the soldiers in the company supply system understand their responsibility for delivering the combat load.

While load planning is entirely the province of the commander, each soldier is responsible for executing the various types of training that prepare him for carrying the unit's load in combat.

The most obvious aspect of training is probably physical conditioning, which is vital to the unit's ability to carry its load. But physical training will not condition a man to carry more than a certain amount of weight. Marshall talks of tests in which men were given 69 pounds to carry on a 15-mile march. Regardless of the amount of training, the men always exhibited the same amount of fatigue. Training is vital, but it cannot raise men above their physical capabilities.

What physical training can do is bring a unit to its maximum load-bearing ability. To accomplish this, the leader must institute a program that prepares his men for load carrying.

FM 21-18 contains a training program that is designed to keep a unit prepared for its Army Physical Fitness Test (APFT) as well as to exercise its load-bearing ability. The program suggests that aerobic conditioning not be done more than three times a week, because excessive aerobic conditioning could interfere with other types of conditioning. The progressive resistance training to strengthen muscles should also be done two or three times a week. This part of the program will sustain a soldier's ability to perform well on the APFT.

Specific, progressive road marches should be scheduled to develop a soldier's ability to march well. The weight carried and the distance marched should be increased systematically but not at the same time.

The final type of training done in conjunction with march training is leader training. This may well be the most important aspect of training, because leaders must properly plan loads if a unit is to succeed in combat.

COMBAT LOAD

FIGHTING LOAD:

LOAD	WEIGHT (POUNDS)
Helmet, ballistic	3.4
Pistol Belt, suspenders, and first-aid pouch	1.6
Canteen, 1-quart, and cover with water (2 each)	5.6
Case, small-arms (2 each)	1.8
Bayonet with scabbard	1.3
Protective mask w/decontamination kit	3.0
Rifle, M16A2 w/30 rounds 5.56mm in magazine	8.8
Magazines (6) with 180 rounds 5.56mm	5.4
Grenade, Fragmentation (4)	4.0
TOTAL	34.9

APPROACH MARCH LOAD:

LOAD	WEIGHT (POUNDS)
ALICE, medium with frame	6.3
Rations, MRE (2 each)	2.6
Canteen, 2-quart and cover with water	4.8
Toilet articles	2.0
Towel	0.2
Bag, waterproof	0.8
E-tool with carrier	2.5
Poncho, nylon	1.3
Liner, poncho	1.6
TOTAL	22.1

Figure 3

Leader training must be conducted at all levels. Company leaders must practice planning loads and handling the combat load through the company trains. Echelons above company must practice accounting for, securing and, when necessary, delivering the higher echelons of the load. Junior leaders should also be taught to assess the risks involved in load planning. This enables them to understand the concept of load planning and also to make sensible load planning decisions when necessary.

Training and planning are the essential ingredients of successful load bearing. These underlying principles, as well as specific programs for both training and planning, are found in FM 21-18. Chapter 5 of the manual is dedicated to a complete discussion of the soldier's load problem and solutions to it.

The battalions that entered the Euphrates River Valley had learned a valuable lesson as a result of their earlier training attack on the bridge. Although their fighting and approach march loads were still as heavy, they knew better how to manage them. When units arrived at their landing zones, the battalions secured their rucksacks (approach march load) with a minimal guard force while the rest of the soldiers occupied their positions. As soon as practicable, soldiers went back, a few at a time, to retrieve the rucksacks. In at least one instance, a unit placed excess ammunition and water in kick-out bundles that could then be taken forward and stored in a central location for further distribution.

This was load planning in action. By using this technique, commanders ensured that their soldiers arrived in the right place at the right time with the right equipment, and that they were ready and able to fight.

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